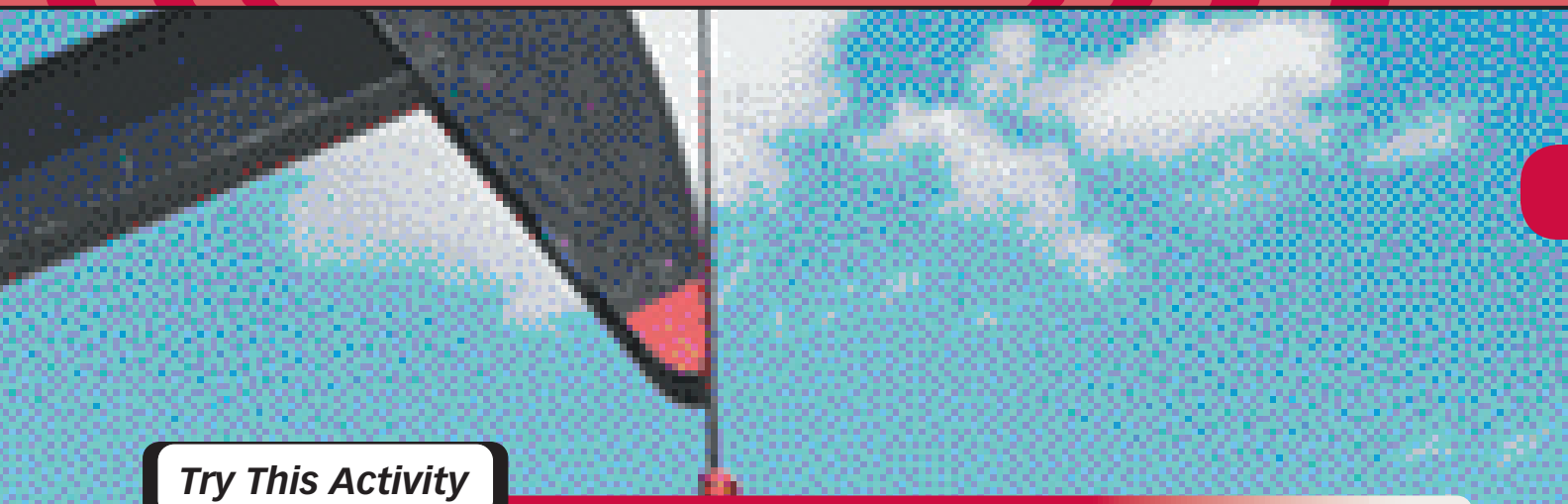
Chapter 3 Organic Chemistry

Take a close look at the oil well pumping petroleum out of the earth. What thoughts come to mind? Most people think of fuel and cars, and they would be right in doing so because fossil fuels are burned for energy.

Petroleum, however, is not only used for energy. In fact, most of the products you purchase contain compounds that are a direct result of developments in the field of organic chemistry—the study of compounds made of carbon atoms. Petroleum is a mixture of many carbon-based compounds and, therefore, acts as the raw material for these processes. Plastics, cosmetics, medicines, and even some food products are made by taking petroleum, refining it, and changing it to into a large variety of human-made (artificial) compounds.

In this chapter you will examine carbon-based molecules that are the building blocks for materials made from petrochemicals. You will investigate the processes used to get these molecules, methods used to classify them, and reactions used to change them. You will be blending science and technology as you look at representations of molecules produced by natural processes and investigate how they can be manipulated into forms people use every day.

The next time you look at an oil well, don't only think about the fuel obtained from it. Think about the multitude of products and goods around you that are made from molecules contained in petroleum. It is important to consider that there is a limited supply of petroleum in the world and that there may be consequences associated with the unwise use of this resource.



Try This Activity

Making an Organic Compound

Organic chemistry involves taking carbon-based compounds, like oil, and reacting them with other reagents to form products with unique and usable properties.

Purpose

You will use chemical reactions to produce a useful substance from a carbon-based material.

Materials

- 30 mL of white glue (This is your carbon-based raw material.)
- 3 mL of powdered borax (This is the reagent that will chemically change the carbon-based raw material.)
- plastic cup (or plastic resealable lunch bag)
- spoon
- source of running water

Science Skills

✓ Performing and Recording
✓ Analyzing and Interpreting

Procedure

step 1: Pour 30 mL of white glue into a plastic cup or plastic bag.

step 2: Add 3 mL of powdered borax to the glue.

step 3: Use a spoon to stir the mixture until it becomes sticky.

step 4: Take the sticky product into your hands and run it under water. Use your hands to shape the sticky material into a ball.

step 5: Gently dry the ball.

step 6: You just made your first organic compound. Explore the properties of the compound you just created. Consider flexibility, ductility, elasticity, conductivity, adhesiveness, cohesiveness, tensile strength, and permeability.

Analysis

Copy the following table into your notebook. You will need more room than what is shown here. Complete the table by choosing a few of the properties listed in step 6 of the procedure or any property you can think of that is not listed.

PROPERTIES OF AN ORGANIC COMPOUND

Property of Compound	Use as a Finished Product	Potential Drawbacks	Tests to Further Assess Possible Development